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A job-related fitness test for the Dutch police

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Background The variety of tasks that characterize police work highlights the importance of being in good physical condition.

Aims To take a first step at standardizing the administration of a job-related test to assess a person's ability to perform the physical demands of the core tasks of police work. The principal research questions were: are test scores related to gender, age and function and are test scores related to body mass index (BMI) and the number of hours of physical exercise?

Methods Data of 6999 police officers, geographically spread over all parts of The Netherlands, who completed a physical competence test over a 1 year period were analysed.

Results Women performed the test significantly more slowly than men. The mean test score was also related to age; the older a person the longer it took to complete the test. A higher BMI was associated with less hours of body exercise a week and a slower test performance, both in women and men.

Conclusions The differences in individual test scores, based on gender and age, have implications for future strategy within the police force. From a viewpoint of 'same job, same standard' one has to accept that test-score differences may lead to the exclusion of certain staff. However, from a viewpoint of 'diversity as a business issue', one may have to accept that on average, both female and older police officers are physically less tailored to their jobs than their male and younger colleagues.

Key words Dutch police; job-related fitness test; physical competence.

Introduction

The variety of tasks that characterize police work highlights the importance of police officers being in good physical condition. The collective agreement for the Dutch police, set up by the Government of the Interior and Kingdom Relations and the police unions (2005–07) emphasises the importance of healthy employment [1]. However, there is growing evidence that the physical condition of police officers falls short of recommended standards. Houtman *et al.* [2] reported that male Dutch police officers are often more obese than average Dutch men. This is especially the case for officers >50 years, who are twice as likely to be seriously obese [with a body mass index (BMI) ≥30] when compared to their average male contemporaries. Bonneau and Brown [3], on reviewing the condition of the Royal Canadian Mounted Police, concluded that the fitness capacity of the average police officer was below the fitness capacity of the average criminal.

Healthy employment is also an important topic from a preventive point of view. Kyröläinen *et al.* [4] have shown that poor muscle fitness and endurance as well as high BMI are risk factors for productivity loss and sickness absenteeism, causing additional costs for the employer. Therefore, workers at a greater risk should be offered more multifaceted information about potential health risks as well as motivational support to improve their lifestyle.

One of the strategies for monitoring and improving the physical condition of police officers is the implementation of a job-related test to assess a person's ability to perform the physical demands of the core tasks of police work. Such a test can serve as a powerful tool to enhance the physical condition of executive officers in the police force. It can be used as a standard for determining the physical

condition of incumbent police officers and outlining a policy in case the standards are not met. Moreover, it can be administered as an instrument for selecting police officer applicants.

Other national police forces use job-related fitness tests for incumbent officers and applicants. The Royal Canadian Mounted Police, for example, uses the PARE (Physical Abilities Requirement Evaluation) (http://www.rcmp.ca/recruiting/pare), and the New Zealand Police works with the physical competence test (http://www.police.govt.nz/recruiting/assessment.physical).

Between 2000 and 2002, Mol and de Vries [5] took a first step in developing a job-related field test that monitored all daily working activities during the duties of 80 police officers from six different geographically spread forces in The Netherlands. Mol *et al.* used the same scientific method of task and activity analysis as Bonneau and Brown [3] and found that, in general, physical aspects of policing are characterized by intermittent relatively long periods of relatively low-intensity tasks/activities (e.g. patrolling by car) and relatively short periods of high-intensity tasks/activities (e.g. arresting a heavily resisting suspect). These findings confirm the statement of Bonneau and Brown [3] that there is a large similarity in task characteristics of police officers in Europe and the USA. In both continents, police work is mainly a sedentary job alternated with physically highly strenuous peak moments.

The results of the studies of Mol [5–7] formed the basis for developing the PCT, a field test that measures the essential physical competences for performing frontline core police tasks.

Currently, physical fitness is only assessed at entry in forces and rarely assessed thereafter. Therefore, in addition to the experiences with the PCT in the selection process of applicants (from 2003 onwards), a pilot study was carried out among incumbent police officers who voluntarily completed the PCT during this period. The objectives of the pilot study were to take a first step in standardizing the administration of the PCT, to get more insight in the physical condition of incumbent police officers and to investigate the suitability of the PCT as a future periodic instrument—not on a voluntary but on a compulsory basis—to monitor the physical condition of police officers in relation with their workload.

A further important issue addressed during the pilot study was to ascertain whether PCT scores are related to the weekly number of hours of physical exercise police officers take and their BMI. Roberts *et al.* [8] and Tammelin *et al.* [9] have presented evidence that the number of hours of physical strain is associated with a lower (better) physical endurance test score. Clark *et al.* [10] conducted a study in which the association between BMI and health status of fire fighters was recorded, leading them to conclude that the BMI continues to prove useful as a screening tool and may be useful in identifying individual fire fighters for health and fitness intervention measures. Bohnker *et al.* [11] found that an increasing BMI was associated with decreasing physical readiness among navy recruits and mariners.

If the BMI and the weekly hours of physical exercise associate with PCT scores, there will be more scientific basis for the idea that the PCT can be used as a tool for monitoring health.

The study presented in this article is guided by two research questions: are PCT results related to gender, age and function group and are PCT scores related to BMI and the number of hours of physical exercise?

Methods

All 26 Dutch forces (N = 35 923) received an invitation to participate, and the PCT pilot took place in 11 police forces, spread over all parts of The Netherlands. A total of 8032 police officers participated in this pilot study on a voluntary basis between June 2006 and June 2007 (see also Figure 1).

Before administering the PCT, all participants filled out a short health risk monitor questionnaire, as participation in the PCT was reliant on participants being in good health. This questionnaire is based on the 'personal medical history questionnaire' of the Lausanne protocol [12] and includes items about chest pain, breathing

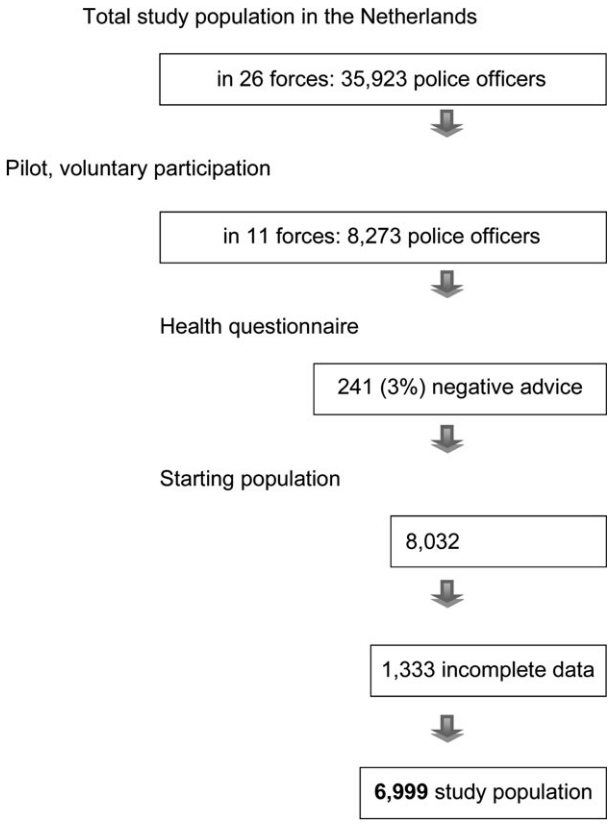

Figure 1. Flowchart of the study population.

problems, chronic illnesses and number of weekly hours of physical exercise.

The PCT simulates a scenario in which a police officer encounters a person violating the law (leading to a foot chase), physically has to overpower the offender (physical control) and finally has to transport either offender and/or casualty (evacuation: carry to safety). The PCT circuit has to be covered in a standard time. The physical requirements for completing the PCT circuit are presented in Table 1.

The information about the test and the way the test had to be carried out was standardized.

Standardization of information to the participating officers was achieved by website information and an introduction brochure. For standardization of the PCT circuit, a manual has been developed for the benefit of the test administrator. This manual contains a description of the different units of the test and a list, which summarises all the necessary materials for administering the test (e.g. floor mats, dummy casualties, etc.). To reduce incorrect completion of the circuit, instruction charts describing each unit/situation by means of illustrations are also part of the standard material. All test instructors are trained in administering the test [13] (http://www.fvtpolitie.nl).

Prior to the test, the BMI of all PCT participants was calculated, with a BMI of $\geq$30 considered to be seriously overweight.

For statistical analysis, age was recoded into three categories ($<$40 years, between 40 and 55 years and $>$55 years) and function group into two categories ('core police tasks' and 'remaining function groups'). Under the category remaining function group come the subcategories 'criminal investigation', 'operational support' and 'other'. The reason for classifying these subcategories into the main category remaining function groups stems from the fact that no substantial mutual differences in PCT scores could be found.

Results

Based on the short health risk questionnaire outcome, 5% of the participants could not start with the PCT immediately. After consulting the occupational physician (OP), 3% were subsequently advised to complete the PCT. The OP restricted 2% temporarily from completing the PCT (for reasons such as sickness, flu, severe cold, injury, etc.) and 1% were excluded from participating in the study.

During the pilot, the data of 8032 police officers were gathered. After eliminating incomplete test data (no function group or no test score entered), the data of 6999 respondents (80% male and 20% female) were found suitable for statistical analysis. Based on 35 923 incumbent police officers in The Netherlands in 2007 (80% male and 20% female), these 6999 respondents form 19% of the entire executive police staff and are representative with regard to gender. A flowchart is presented in Figure 1.

The mean PCT scores of women and men are presented in Table 2.

On average, women scored 26 more seconds in the test than men (3 min 43 s and 3 min 17 s), showing that women perform the test more slowly. This is a statistically significant difference (effect size 1.15, indicating a large effect). The 'overall' mean test score for men and women together was 3 min 23 s. There was a large range between the fastest and the slowest test score of both women and men (3 min 39 s and 3 min 2 s, respectively).

The relationships between the mean test scores per gender, age and function group are presented in Table 3.

As shown in Table 3, the mean test score was positively related with age; the older a person the longer it took to complete the PCT. It should be noted, however, that the number of participants diminished strongly in the higher age category ($>$55 years), which applied especially to female police officers. The mean test scores for both sexes between the function groups 'core police tasks' and 'remaining function groups' showed a significant difference in favour of the first ($P < 0.001$). On average, women were 11 s and men 10 s faster in the function group 'core police tasks' than in the function group 'remaining function group'. The differences between PCT scores of function groups that came under 'remaining function groups' were very small and not significant.

Table 4 presents the mean test score, related to the BMI, and the average number of hours of physical exercise during a week. To enhance survey ability, the sample was subdivided into four parts of equal size (quartiles).

An increase in the BMI was associated with a decrease of the mean number of hours of physical exercise a week and a slower test performance, both in women and men. Participants with a higher BMI and taking less physical exercise took longer to finish the circuit. A Pearson correlation of -0.046 showed that BMI and hours of physical exercise were significantly related ($P < 0.001$).

To predict the PCT score, the variables gender, function group, age, BMI and hours of physical exercise were entered in a linear regression analysis. All variables contributed significantly. Table 5 shows that gender contributes the most to the score on the PCT, while age holds the

Table 1. Components of the PCT

Components of the PCT
- Running 226.5 m, while climbing an obstacle (1 m 10 cm) and jumping over low obstacles
- Pushing a 200 kg cart three times over a distance of 6 m
- Pulling the cart two times over the same distance
- Lifting and carrying a ball of 5 kg 18 times for 3 m a time
- Dragging a 48 kg dummy casualty for 5 m
The whole circuit is electronically timed and elapsed time is presented in minutes and seconds.

Table 2. PCT score by gender

Sex	Mean test score	Median	Fastest time	Slowest time	*n* (%)
Women	3 min 43 s	3 min 40 s	2 min 39 s	6 min 18 s	1432 (20)
Men	3 min 17 s	3 min 14 s	2 min 17 s	5 min 19 s	5567 (80)
Total	3 min 23 s	3 min 19 s	–	–	6999 (100)

Table 3. Mean test score by age and function, women and men

Age category	Core police tasks		Remaining function groups		Total	
	Mean	*n*	Mean	*n*	Mean	*n*
Women						
<40 years	3 min 36 s	640	3 min 46 s	249	3 min 39 s	889
40–55 years	3 min 46 s	130	3 min 54 s	162	3 min 50 s	292
>55 years	3 min 50 s	9	4 min 8 s	4	3 min 56 s	13
Total	3 min 38 s	779	3 min 49 s	415	3 min 43 s	1194
Men						
<40 years	3 min 3 s	1517	3 min 11 s	410	3 min 5 s	1927
40–55 years	3 min 21 s	1258	3 min 23 s	1145	3 min 22 s	2403
>55 years	3 min 41 s	110	3 min 46 s	112	3 min 43 s	222
Total	3 min 12 s	2885	3 min 22 s	1667	3 min 17 s	4552

Total of Table 3 is different from total of Table 2; reason is that not everyone has entered function group and age.

Table 4. Mean test score of women and men core police tasks and remaining function groups presented in quartiles and related to BMI and weekly hours of sport/exercise

Quartile	Core police tasks				Remaining function groups			
	Test score	BMI	Hours sport	*n*	Test score	BMI	Hours sport	*n*
Women								
First	3 min 14 s	22.8	3.2	228	3 min 21 s	23.0	3.3	129
Second	3 min 31 s	23.0	2.9	229	3 min 41 s	24.0	2.5	130
Third	3 min 43 s	23.2	2.1	228	3 min 56 s	24.0	2.0	129
Fourth	4 min 07 s	24.2	2.0	229	4 min 25 s	26.0	1.4	130
Men								
First	2 min 49 s	24.4	3.6	861	2 min 58 s	25.1	3.0	530
Second	3 min 04 s	25.2	2.8	861	3 min 14 s	26.0	2.5	531
Third	3 min 17 s	26.0	2.2	861	3 min 27 s	26.1	2.1	531
Fourth	3 min 42 s	27.0	1.8	861	3 min 54 s	27.2	1.7	531

second position. Function group contributes the less to PCT scores.

Discussion

The principal findings of this study were that the PCT score of respondents appeared to be significantly related to gender, with women needing more time to cover the circuit than men. Moreover, there was also a relationship between PCT score and age indicating that older police officers needed more time to cover the circuit than younger officers. The PCT score also appeared to be related to function group; police staff in the function group 'core police tasks' covered the circuit faster than staff in all remaining function groups. Since deskbound ranks are equally divided over the function groups, these cannot be held responsible for the test-score differences that were found.

Congruent with literature findings [8–11], participants with a higher BMI and participants who performed fewer hours of weekly body exercise needed more time to cover the circuit. BMI and hours of weekly body exercise,

Table 5. Regression analysis predicting PCT score with gender, function group, age, BMI and hours of physical exercise

	Unstandard coefficient	Standard coefficient, β	Significance, *P*
Gender (men)[a]	−35.671	−0.592	<0.001
Function group (core police tasks)[a]	−3.884	−0.076	<0.001
Age	0.906	0.363	<0.001
BMI	1.515	0.182	<0.001
Hours of physical exercise	−1.433	−0.164	<0.001

[a]Reference groups are bracketed.

however, were related, which is confirmed in this study. Though these findings are to be expected, it is clear that they indicate that there is a close relationship between these lifestyle factors in private and work sphere (which is 'translated' in the PCT scores).

An important aim of the study was to contribute to the standardization of the test. One of the central questions with regard to standardization was which maximum test scores should be used as a standard for men and women to be able to reliably predict if an executive police officer can meet the requirements of his work. Such standards should also be developed for different age categories.

It should be emphasized that standardization of a test is not only a matter of science but also a matter of making choices based on strategic arguments. Science can contribute to the production of standards for the desired fitness of a population, but it is experienced experts who should decide which standards are clinically relevant.

If one argues that any executive police officer should meet the requirements of his or her work (same job same standard), such reasoning has organizational consequences, since it means that female or older police officers may not be able to fulfil all the requirements of physically more demanding jobs, taking their slower test performance into account.

If one argues, however, from a viewpoint of 'diversity as business issue', which means that—within reason—differences in test scores due to age and gender may not lead to the exclusion of staff, one has to accept that some aspects of the work of the executive police officers concerned do not meet with equality standards. Strategic choices do also stem from the way the executive work is carried out within the police force. For example, if it is unlikely that senior officers will be called upon to undertake arrest and restraint duty, it may be more acceptable that they have a reduced level of physical fitness.

Because of the fact that the PCT is a new test, especially developed for the Dutch police, there are no reference groups as yet. There are three tests that are used in a setting that is more or less comparable with the Dutch Police. The Royal Dutch Army [14] has implemented an obligatory fitness test which is gender specific but not job related. The Royal Canadian Mounted Police uses an obligatory fitness test, which is job related but not gender specific (same job and same standard) (http://www.rcmp.ca/recruiting/pare). The New Zealand Police uses an obligatory fitness test that is both job related and gender specific (http://www.police.govt.nz/recruiting/assessment.physical). All three tests are for both the recruitment of new personnel and determining the physical condition of incumbent staff. None of the tests, however, has been used in a voluntary setting.

It should be realized that the slower performance of older people and women on the PCT circuit cannot solely be attributed to the reduced overall stamina of women but may also be dependent on the nature of the test. Some tests favour male physique, while others are a reflection of a different body composition of women. It may well be that these tendencies also apply to older people. Currently, however, we have no reason to think that this is the case with the PCT.

Apart from using the PCT as a screening or selection tool, a standardized test to measure the employees' physical competence for their work may also work as a stimulant to improve someone's lifestyle and associated health benefits including possible reduced absenteeism. Therefore, both employer and employee have an important role in relation to the implementation of the PCT in the future; the employer as a provider of a physical performance test which has to meet with all the preconditions for a structural implementation, and the employee as a professional who is responsible for maintaining a good physical condition to meet the requirements of executive police work, which are reflected in the PCT.

Our study has both strengths and weaknesses. The strength of our study is that it provides valuable insight into PCT test scores of incumbent police officers and its relation with gender, age, function, BMI and hours of physical exercise. Nevertheless, the study also has some weaknesses. The fact that the PCT was administered in a voluntary setting may have had consequences for the test scores since it may well be that only the more physically active colleagues participated in the study, a type of selection bias. Secondly, such bias may also have been caused by the fact that during the intake procedure, police officers were excluded for health reasons. As a consequence, police staff in good physical condition may have been over-represented in the study. However, this over-representation will not be substantial given the fact that only a small proportion of police officers could not start the PCT. This proportion may, however, grow when the PCT is made compulsory for all police officers.

To be able to set valid standards for the PCT and to test psychometric characteristics, more data have to be

gathered. Further research is needed especially with regard to the future mandatory context within which the PCT will be administered. Longitudinal research, especially, can shed light on the predictive validity of the PCT. It will be of great value to be both able to estimate real 'fitness for duty' and to intervene when this fitness falls short.

Key points

- In 2001, a research project was carried out in The Netherlands to determine the daily working activities of executive police officers during different duties.
- The study presented can be regarded as the first step in developing a job-related fitness test that measures the essential physical competencies to perform frontline core police tasks.
- After further standardization and validation, this test can be used both for the selection of applicants and for monitoring the physical condition of executive police officers.

Conflicts of interest

None declared.

References

1. Ministry of the Interior and Kingdom Relations. *Collective Agreement Dutch Police*. The Hague, 23 November 2005.
2. Houtman I, Jettinghof K, Brenninkmeijer V *et al*. *De politie 5 jaar later: werkstress en het effect van maatregelen. (Work Related Stress Among Police Officers and the Effect of Interventions)*. Report nr: 19071/10308. Hoofddorp, The Netherlands: TNO (Netherlands Organisation for Applied Scientific Research), 2005.
3. Bonneau J, Brown J. Physical ability, fitness and police work. *J Clin Forensic Med* 1995;**2:**157–164.
4. Kyröläinen H, Häkkinen K, Kautiainen H *et al*. Physical fitness, BMI and sickness absence in male military personnel. *Occup Med (Lond)* 2008;**58:**251–256.
5. Mol E, de Vries WHK. *Observatie en Registratie van Fysieke Taken en Activiteiten bij de Nederlandse Politie (Determining Physical Tasks and Activities in Daily Work of Core Police Tasks)*. Amsterdam, The Netherlands: VU University Amsterdam, Faculty of Human Movement Sciences, 2007.
6. Mol E, Visser B. *Minimale eisen aan fysieke vaardigheden en capaciteit bij de Nederlandse politie (Minimal Demands on Physical Competences and Capacity of the Dutch Police)*. Amsterdam, The Netherlands: VU University Amsterdam, Faculty of Human Movement Sciences, 2002.
7. Mol E, Visser B. The Development of a Competence-Based Physical Test for Dutch Police Recruits. Annual Meeting Abstracts of the 51th Meeting of the American College of Sports Medicine, Indianapolis, USA. *Med Sci Sports Exercise* 2004;**36(Suppl.):**5.
8. Roberts MA, O'Dea J, Boyce A, Mannix ET. Fitness levels of firefighter recruits before and after a supervised exercise training program. *J Strength Cond Res* 2002;**16:** 271–277.
9. Tammelin T, Näyhä S, Rintamäki H. Cardiorespiratory fitness of males and females of northern Finland birth cohort of 1966 at age 31. *Int J Sports Med* 2004;**25:** 547–552.
10. Clark S, Rene A, Theurer WM *et al*. Association of body mass index and health status in firefighters. *J Occup Environ Med* 2002;**44:**940–946.
11. Bohnker BK, Sack DM, Wedierhold L *et al*. Navy physical readiness test scores and body mass index. *Mil Med* 2005; **170:**851–854.
12. Corrado D, Pelliccia A. Cardiovascular pre-participation screening of young competitive athletes for prevention of sudden death: proposal for a common European protocol. *Eur Heart J* 2005;**26:**516–524.
13. Strating M, Bakker RH. *De Fysieke vaardigheidstoets: klaar voor de start. (Background, Standardisation, Reference Times and Manual of the PCT for the Dutch Police)*. De Bilt, The Netherlands: Landelijk programma HRM Politie, 2008.
14. Royal Dutch Army. Background Information 'Condition Test' 2005. Renewed Directives Condition Test nr 622/ 2005. The Hague, The Netherlands.